

# MOLECULAR CLOCKS LAB

Name \_\_\_\_\_  
Date \_\_\_\_\_

## Exercise I

1. Number of amino acid differences between: Organisms A and B: 5
2. Organisms A and C: 0
3. Organisms B and C: 5
4. Which is the horse? B How do you know?

B has the most differences in the amino acids of the three organisms

5. Explanation

Evolution is the idea that within a body things change over time based on amount of time and environmental changes. The theory of evolution talks about how monkeys and humans are related which is why the amino acids in the human and gorilla are so similar.

## Exercise II

1. Two most closely related species are \_\_\_\_\_wiggs\_\_\_\_\_ and \_\_\_\_\_arps\_\_\_\_\_

How do you know?

There is only a 2% difference in the two

2. Species most distant from the other three is \_\_\_\_\_chortles\_\_\_\_\_

How do you know?

Have a 6% difference from wiggs and gleeps

3. Cladogram:

1. \_\_\_\_\_Wiggs\_\_\_\_\_

2. \_\_\_\_\_Arps\_\_\_\_\_

3. \_\_\_\_\_Gleeps\_\_\_\_\_

4. \_\_\_\_\_Chortles\_\_\_\_\_

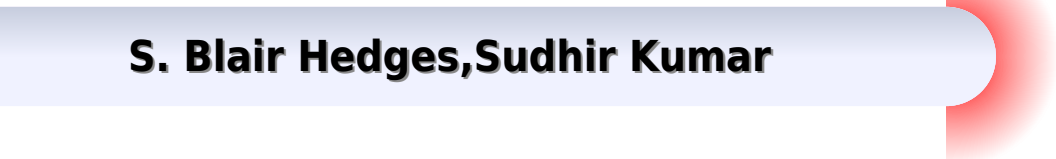
Earliest split point occurred about \_\_\_\_\_12\_\_\_\_\_ million years ago.

Middle split point occurred about \_\_\_\_\_6\_\_\_\_\_ million years ago.

Most recent split point occurred about \_\_\_\_\_4\_\_\_\_\_ million years ago.

# Biology Study Guide Answers Molecular Clocks

**S. Blair Hedges, Sudhir Kumar**



## **Biology Study Guide Answers Molecular Clocks:**

**Life: The Science of Biology Study Guide** William K. Purves, Edward Dzialowski, Lindsay Goodloe, Betty McGuire, Nancy Guild, Paula Mabee, 2003-12-26 New edition of a text presenting underlying concepts and showing their relevance to medical agricultural and environmental issues Seven chapters discuss the cell information and heredity evolutionary process the evolution of diversity the biology of flowering plants and of animals and ecology and biogeography Topics are linked by themes such as evolution the experimental foundations of knowledge the flow of energy in the living world the application and influence of molecular techniques and human health considerations Includes a CD ROM which covers some of the subject matter and introduces and illustrates 1 700 plus key terms and concepts Annotation copyrighted by Book News Inc Portland OR *Student Study Guide for Biology [by] Campbell/Reece* Martha R. Taylor, 2002 Marty Taylor Cornell University Provides a concept map of each chapter chapter summaries a variety of interactive questions and chapter tests *Study Guide to Accompany Biology, the Science of Life, Third Edition* W. J. Leverich, 1991 **Computational**

**Biologist - The Comprehensive Guide** VIRUTI SHIVAN, Dive into the dynamic and evolving world of computational biology with this essential guide where complex biological systems meet the precision of computer science This comprehensive manual serves as your all in one resource for mastering the skills required to decode the mysteries of biology using computational techniques It is meticulously crafted for both beginners intrigued by the intersection of biology and computing and seasoned professionals aiming to deepen their expertise The absence of images or illustrations due to copyright reasons is more than compensated for by rich detailed explanations and vivid thought provoking examples that bring the essence of computational biology to life In a field where innovation is constant this guide stands as a beacon offering insights into the latest research methodologies data analysis techniques and their applications in solving real world biological problems From DNA sequencing and genetic engineering to the modeling of complex biological networks this book not only equips you with the theoretical knowledge but also guides you through practical steps to implement these techniques Each chapter is an invitation to explore the incredible potential of computational biology making this book an indispensable companion for anyone looking to make their mark in understanding and harnessing the power of life itself

Biology Stories Mike Tveten, 2020-11-09 Storytelling is the easiest way to become a more effective teacher Tying a concept to a memorable story is the best method of engaging your students and ensuring they will never forget the importance and relevance of the concept This book contains 50 stories directly tied to content taught in biology These stories are ready to use read them to your students paraphrase them in your own words or use the information to create materials for your courses The table of contents lists an order of topics that follows nearly every general biology textbook with relevant stories for each topic Stories include the Radium Girls radiation Genesis Burkett osmosis Johnny Appleseed fermentation Nancy Wexler and Huntington s Disease genetics the first conviction based on DNA fingerprinting biotech when humans

started wearing clothes evolution egret plume hats ecology and many more Some of the stories can be tied to more than one concept providing a great way to help students integrate concepts from across your curriculum      **Test Items and**

**Interactive Electronic Study Guide Questions for Starr's Biology : Concept and Applications** Larry G. Sellers,2000

**Life Study Guide** David E. Sadava,Gordon H. Orians,Craig Heller,William K. Purves,2006-12-22 Especially helpful for AP Biology students each chapter of the study guide offers a variety of study and review tools The contents of each chapter are broken down into both a detailed review of the Important Concepts covered and a boiled down Big Picture snapshot The guide also covers study strategies common problem areas and provides a set of study questions both multiple choice and short answer      *Student Study Guide to Accompany Biology and Human Concerns, by E. Peter Volpe* Peter A.

Rosenbaum,1993      **The Timetree of Life** S. Blair Hedges,Sudhir Kumar,2009-04-23 The evolutionary history of life includes two primary components phylogeny and timescale Phylogeny refers to the branching order relationships of species or other taxa within a group and is crucial for understanding the inheritance of traits and for erecting classifications However a timescale is equally important because it provides a way to compare phylogeny directly with the evolution of other organisms and with planetary history such as geology climate extraterrestrial impacts and other features The Timetree of Life is the first reference book to synthesize the wealth of information relating to the temporal component of phylogenetic trees In the past biologists have relied exclusively upon the fossil record to infer an evolutionary timescale However recent revolutionary advances in molecular biology have made it possible to not only estimate the relationships of many groups of organisms but also to estimate their times of divergence with molecular clocks The routine estimation and utilization of these so called time trees could add exciting new dimensions to biology including enhanced opportunities to integrate large molecular data sets with fossil and biogeographic evidence and thereby foster greater communication between molecular and traditional systematists They could help estimate not only ancestral character states but also evolutionary rates in numerous categories of organismal phenotype establish more reliable associations between causal historical processes and biological outcomes develop a universally standardized scheme for biological classifications and generally promote novel avenues of thought in many arenas of comparative evolutionary biology This authoritative reference work brings together for the first time experts on all major groups of organisms to assemble a timetree of life The result is a comprehensive resource on evolutionary history which will be an indispensable reference for scientists educators and students in the life sciences earth sciences and molecular biology For each major group of organism a representative is illustrated and a timetree of families and higher taxonomic groups is shown Basic aspects of the evolutionary history of the group the fossil record and competing hypotheses of relationships are discussed Details of the divergence times are presented for each node in the timetree and primary literature references are included The book is complemented by an online database [www.timetree.net](http://www.timetree.net) which allows researchers to both deposit and retrieve data      **Fundamentals of Evolutionary Biology** Supreet

Saini,2025-10-30 Evolution is a stochastic process and given the amount of data generated in biological sciences today there is a pressing need for people with a quantitative background to understand and contribute toward the understanding of evolution leading to better interaction between stakeholders This book equips engineers and physical scientists to make biologically relevant quantitative representations of evolutionary processes The concepts of evolution are introduced via semi quantitative treatment with graphical illustrations and explain how evolution experiments are conducted in a laboratory Features Discusses background concepts of evolutionary biology and experimental evolution Helps readers develop a geometric view of evolutionary processes Covers both biological and mathematical foundations in equal measure Illustrates coding exercises supported by pertinent MATLAB codes for the provided problems Includes homework problems and a solutions manual This book is aimed at senior undergraduate and graduate students in engineering and physical sciences

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